

Trend Study 18A-24-07

Study site name: Salt Mountain Stock Pond.

Vegetation type: Chained, Seeded PJ.

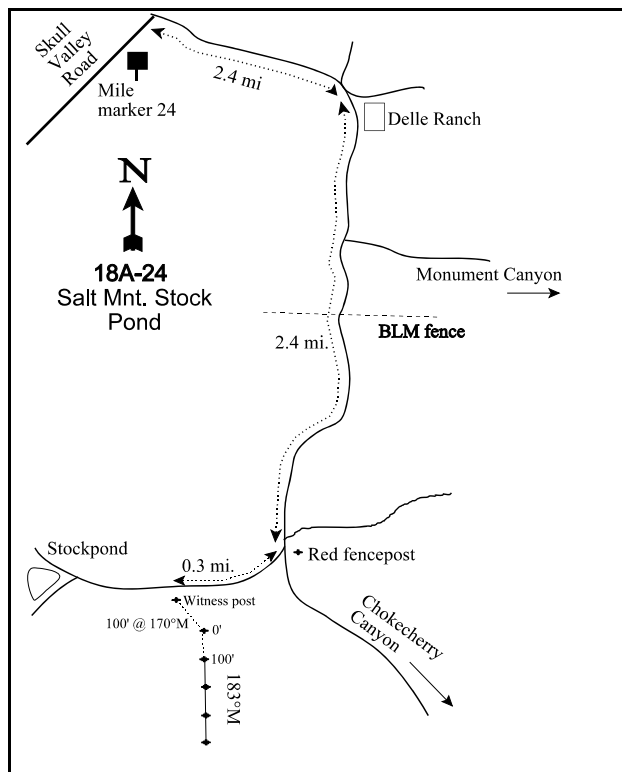
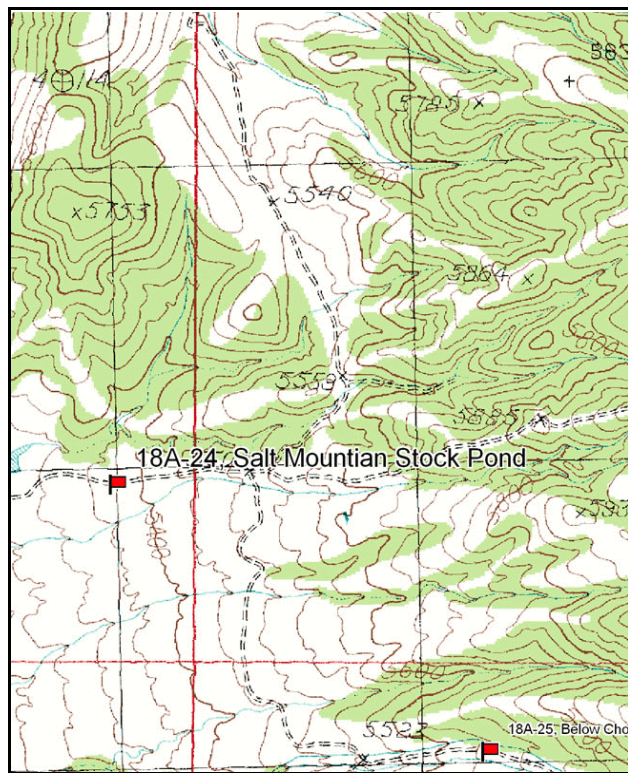
Compass bearing: frequency baseline 183 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

Rebar: Belt 4 rebar is at 13 feet in a gully

### LOCATION DESCRIPTION

Turn east off Skull Valley Road between mile mark 24 and 25. From the Skull Valley Road, go 2.4 miles staying right on the main road to Delle Ranch ponds and trees. The road then turns south. From Delle Ranch, proceed south for 2.4 miles to an intersection to the right (west) heading to Salt Mountain. There will be a red post on the east side of this intersection. Turn right and proceed 0.30 miles to a witness post on the left side of the road. From the witness post, the 0-foot baseline stake is 21 paces away at an azimuth of 185 degrees magnetic. The study is marked by green steel "T" fenceposts approximately 12 to 18 inches in height. The 0-foot baseline stake has a browse tag, number 5926, attached.

Map Name: Salt Mountain

### Diagrammatic Sketch

Township 3S, Range 8W, Section 24

GPS: NAD 83, UTM 12T 356915 E 4489116 N

## DISCUSSION

### Salt Mountain Stock Pond - Trend Study No. 18A-24

#### Study Information

This study is located on a chained and seeded juniper woodland immediately east of Salt Mountain [elevation: 5,400 feet (1,646 m), slope: 8%, aspect: southwest]. The area was treated again between the 1983 and 1989 samplings to remove most of the remaining juniper (*Juniperus osteosperma*) trees. A stock pond lies approximately 1,000 feet (305 m) west of the study. In wet years, the pond could serve as a water source, however, it was dry in 2002 and 2007. Historically, the area has been important deer winter range and also provides summer grazing for cattle. An old pellet group transect traverses the study area. Deer use was estimated at 27 deer days use/acre (74 ddu/ha) in 2002, which decreased to 4 deer days use/acre (10 ddu/ha) in 2007. There was also some elk use in 2007, estimated at 5 days use/acre (12 edu/ha). There was no cattle use in 2002, but use from the previous summer was estimated at 8 cattle days use/acre (22 cdu/ha). It increased slightly to 10 cattle days use/acre (25 cdu/ha) in 2007.

#### Soil

The soil is characterized within the Abela series (USDA-NRCS 2007). The soils in this series were alluvially deposited and are medium to fine textured. The soil is a sandy clay loam with a moderately alkaline soil reaction (pH 7.9). The soil phosphorus is low at only 4.8 ppm. Values less than 6 ppm may limit plant growth and development in rangeland ecosystems (Tiedemann and Lopez 2004). A few large rocks are present on the soil surface. The area initially showed evidence of moderate sheet erosion. This resulted largely from trampling by cattle and a general lack of good protective ground cover. Bare soil cover averaged 30% prior to 1997, and has remained stable at 16% since 1997. The soil erosion condition class was slight in 2002 and stable in 2007.

#### Browse

The vegetative composition is dominated by Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) interspersed with Utah juniper trees. Sagebrush cover declined slightly from 10% in 1997 to 8% in 2002 and 2007. From 1989 to 2004, sagebrush maintained a stable density of approximately 3,000 plants/acre (7,413 plants/ha). In 2007, it decreased by 11% to 2,720 plants/acre (6,721 plants/ha). Decadence has remained relatively high, ranging from 43% in 1989 to 31% in 2002. Young recruitment was good in 1997 and 2002, with 18% and 22% of the population consisting of young plants, respectively. In 2007, recruitment dropped to 7%, and the majority of the plants were mature or decadent. During the 1983 reading, 23% of the sagebrush plants showed poor vigor. Many plants had a yellow or chlorotic appearance, which may be indicative of a shallow hardpan, a serious iron deficiency, or an insect or disease problem. In subsequent sample years, plants with poor vigor have comprised 15%-20% of the population. Eighty-six percent of the plants were classified as having moderate-heavy use in 1983, but use has been light since. The average annual leader growth was 1.5 inches (3.8 cm) in 2002 and 1.6 inches (4.1 cm) in 2007. Antelope bitterbrush (*Purshia tridentata*) occurs infrequently, and the scattered plants were observed to be heavily hedged. Broom snakeweed (*Gutierrezia sarothrae*) was first sampled in 1989, and has fluctuated in density between 200 plants/acre (494 plants/ha) and 4,680 plants/acre (11,564 plants/ha).

Utah juniper trees continue to encroach upon the treatment, despite efforts to control them. The point-centered quarter data estimates for juniper were 51 trees/acre (126 trees/ha) in 2002 and 67 trees/acre (165 trees/ha) in 2007. The average tree trunk diameter was 1.9 inches (4.8 cm) in 2002 and 2.7 inches (6.9 cm) in 2007. The density of juniper is increasing, with established trees maturing. Ninety percent of the trees sampled in 2007 were between 1 (0.3 m) and 8 (2.4 m) feet tall.

#### Herbaceous Understory

Although the area was seeded with introduced perennial species, Sandberg bluegrass (*Poa secunda*), a native

species, was the most abundant perennial grass in 1983 and 1989. This species had a quadrat frequency of 89% in 1983 and 80% in 1989. Sandberg bluegrass has remained abundant, but has fluctuated with each reading since 1989. Crested wheatgrass (*Agropyron cristatum*) was the only seeded species sampled. It has been the most abundant perennial grass since 1997. Average crested wheatgrass cover increased from 16% in 1997 to 23% in 2002, then decreased to 18% in 2007. It has contributed an average 65% of the total herbaceous cover since 1997. Cheatgrass (*Bromus tectorum*) is present, and its average cover increased from 2% in 1997 and 2002 to 5% in 2007. Cheatgrass comprised 8% of the total grass cover in 1997 and 2002, and increased to 16% of the grass cover in 2007. Between 2002 and 2007, cheatgrass quadrat frequency increased from 55% to 91%. Forb composition is diverse, but most species occur infrequently. It is composed almost entirely of native species, but offers little forage value to wintering deer.

#### 1989 TREND ASSESSMENT

Since 1983, portions of the old chaining were treated again for the removal of most of the young trees. The trend for browse is down. The density of sagebrush decreased 35%. There was a large number of seedlings, but no young plants were sampled. The number of plants classified as having poor vigor, however, decreased slightly from 23% to 15%. The trend for grass is stable. The sum of nested frequency for perennial grasses changed little. Most of the grasses were perennials and provided good forage value. The trend for forbs is down. The nested frequency of perennial forbs decreased by 58% between 1983 and 1989. Forbs were a very minor component of the understory.

browse - down (-2)

grass - stable (0)

forb - down (-2)

#### 1997 TREND ASSESSMENT

The trend for browse is stable. Sagebrush density did not change. Young plants increased from 0% of the population to 18%. The decadence of sagebrush decreased from 43% to 33%, however, plants classified as dying increased from 3% to 19%. The trend for grass is up. There was a significant increase in the nested frequency of crested wheatgrass, and the sum of the nested frequency of perennial grasses increased by 22%. Cheatgrass and Japanese brome (*Bromus japonicus*) were present, but provided less than 2% combined cover. The trend for forbs is up. There was a large increase in the nested frequency of perennial forbs, however, they still composed only 11% of the herbaceous understory, and less than 1% of the total ground cover. Sixty-one percent of the forb cover was bur buttercup (*Ranunculus testiculatus*), which is allelopathic and has no use for wildlife or cattle (Buchanan et al. 1978). The Desirable Components Index (DCI) was rated as good due to a favorable browse and perennial grass cover, and a lack of noxious weeds.

winter range condition (DCI) - good (57) Low potential scale

browse - stable (0)

grass - up (+2)

forb - up (+2)

#### 2002 TREND ASSESSMENT

The trend for browse is stable. Sagebrush density remained unchanged, use was mostly light, and decadence was similar to that in 1997 at 31%. Sixteen percent of the plants were classified as dying in 2002. Young recruitment remained good at 22% of the population. The trend for grass is stable. The sum of nested frequency for perennial grasses remained stable, and the nested frequency of crested wheatgrass increased significantly. Crested wheatgrass provided 82% of the total grass cover and 81% of the total herbaceous cover. The sum of nested frequency for annual grasses increased 13%, however, none of the individual species increased significantly in nested frequency. The trend for forbs is down. The sum of nested frequency for perennial forbs decreased 92%. Forbs contributed only 1% of the total vegetative cover, and provided little forage value. Bur buttercup decreased significantly, from 61% of the total forb cover to only 37%. Numerous species that were sampled in 1997 were not found in 2002. The DCI remained stable with a rating of good.

winter range condition (DCI) - good (55) Low potential scale

browse - stable (0)

grass - stable (0)

forb - down (-2)

## 2007 TREND ASSESSMENT

The trend for browse is slightly down. The sagebrush density decreased from 3,060 plants/acre (7,561 plants/ha) to 2,720 plants/acre (6,721 plants/ha). Young recruitment decreased from 22% of the population to 7%. Decadent plants and those classified as dying slightly increased. Plants displaying poor vigor increased from 16% of the population to 20%, and the sagebrush defoliator moth (*Aroga websteri*) had infested 15% of the population. The trend for grass is stable. The sum of nested frequency for perennial grasses increased 12%. Sandberg bluegrass increased significantly in nested frequency, however, cheatgrass also increased. The trend for forbs is up. The sum of nested frequency for perennial forbs increased substantially, and perennial forb cover increased from near 0% to 4%. In 2007, forbs comprised 19% of the total vegetative cover, which increased from 1% in 2002. However, bur buttercup increased significantly, and forb composition remained poor in forage value. The DCI remained stable with a rating of good.

winter range condition (DCI) - good (53) Low potential scale

browse - slightly down (-1)

grass - stable (0)

forb - up (+2)

## HERBACEOUS TRENDS --

Management unit 18A, Study no: 24

T y p e	Species	Nested Frequency					Average Cover %		
		'83	'89	'97	'02	'07	'97	'02	'07
G	Agropyron cristatum	<sub>a</sub> 102	<sub>a</sub> 145	<sub>b</sub> 267	<sub>c</sub> 283	<sub>c</sub> 277	16.01	23.15	18.07
G	Agropyron spicatum	<sub>a</sub> 10	<sub>a</sub> 3	-	<sub>a</sub> 12	<sub>a</sub> 13	-	.68	.83
G	Bromus japonicus (a)	-	-	<sub>a</sub> 25	<sub>a</sub> 27	<sub>a</sub> 37	.11	.09	.10
G	Bromus tectorum (a)	-	-	<sub>a</sub> 134	<sub>a</sub> 152	<sub>b</sub> 283	1.77	2.19	4.52
G	Poa secunda	<sub>b</sub> 239	<sub>b</sub> 221	<sub>ab</sub> 205	<sub>a</sub> 169	<sub>b</sub> 233	3.64	2.03	5.46
G	Sitanion hystrix	<sub>a</sub> 1	<sub>b</sub> 18	-	<sub>a</sub> 3	<sub>a</sub> 1	-	.15	.03
G	Vulpia octoflora (a)	-	-	-	1	-	-	.00	-
Total for Annual Grasses		0	0	159	180	320	1.88	2.28	4.62
Total for Perennial Grasses		352	387	472	467	524	19.65	26.02	24.41
Total for Grasses		352	387	631	647	844	21.54	28.30	29.03
F	Agoseris glauca	<sub>a</sub> 10	<sub>a</sub> 12	<sub>a</sub> 8	<sub>a</sub> 4	<sub>a</sub> 7	.02	.01	.04
F	Alyssum alyssoides (a)	-	-	<sub>a</sub> 5	<sub>a</sub> 2	<sub>b</sub> 26	.01	.01	.05
F	Antennaria rosea	<sub>b</sub> 25	<sub>b</sub> 24	<sub>a</sub> 6	<sub>a</sub> 2	-	.03	.00	-
F	Astragalus cibarius	<sub>b</sub> 36	-	<sub>ab</sub> 29	<sub>a</sub> 3	<sub>c</sub> 82	.35	.01	3.66
F	Astragalus sp.	-	-	1	-	-	.00	-	-
F	Astragalus utahensis	<sub>a</sub> 1	<sub>a</sub> 2	<sub>a</sub> 2	-	<sub>a</sub> 2	.07	-	.03
F	Castilleja linariaefolia	<sub>a</sub> 2	-	<sub>a</sub> 2	-	<sub>a</sub> 4	.00	-	.01
F	Camelina microcarpa (a)	-	-	<sub>a</sub> 12	<sub>a</sub> 2	<sub>a</sub> 1	.02	.00	.00
F	Calochortus nuttallii	<sub>bc</sub> 17	-	<sub>ab</sub> 17	<sub>a</sub> 1	<sub>c</sub> 29	.04	.00	.17
F	Castilleja sp.	-	-	3	-	-	.00	-	-
F	Chaenactis douglasii	<sub>ab</sub> 5	<sub>a</sub> 1	<sub>b</sub> 18	-	<sub>ab</sub> 8	.06	-	.22
F	Cirsium neomexicanum	<sub>a</sub> 6	<sub>a</sub> 5	<sub>a</sub> 5	-	-	.06	-	-

T y p e	Species	Nested Frequency					Average Cover %		
		'83	'89	'97	'02	'07	'97	'02	'07
F	<i>Collinsia parviflora</i> (a)	-	-	<sub>a</sub> 3	<sub>a</sub> 10	<sub>a</sub> 10	.00	.02	.02
F	<i>Crepis acuminata</i>	-	-	<sub>a</sub> 2	-	<sub>a</sub> 3	.00	-	.03
F	<i>Cryptantha</i> sp.	-	2	-	-	-	-	-	-
F	<i>Descurainia pinnata</i> (a)	-	-	-	3	-	-	.00	-
F	<i>Draba</i> sp. (a)	-	-	<sub>a</sub> 5	-	<sub>b</sub> 18	.01	-	.03
F	<i>Epilobium brachycarpum</i> (a)	-	-	9	-	-	.07	-	-
F	<i>Erodium cicutarium</i> (a)	-	-	-	<sub>a</sub> 6	<sub>a</sub> 9	-	.03	.07
F	<i>Eriogonum</i> sp.	2	-	-	-	-	-	-	-
F	<i>Helianthus annuus</i> (a)	-	9	-	-	-	-	-	-
F	<i>Heterotheca villosa</i>	-	-	-	-	3	-	-	.03
F	<i>Holosteum umbellatum</i> (a)	-	-	<sub>a</sub> 5	<sub>b</sub> 42	<sub>c</sub> 270	.01	.12	4.19
F	<i>Lactuca serriola</i>	-	-	1	-	-	.00	-	-
F	<i>Machaeranthera canescens</i>	<sub>a</sub> 4	<sub>a</sub> 3	<sub>b</sub> 20	-	-	.06	-	-
F	<i>Microsteris gracilis</i> (a)	-	-	<sub>a</sub> 4	<sub>a</sub> 8	-	.00	.02	-
F	<i>Oenothera</i> sp.	2	-	-	-	-	-	-	-
F	<i>Penstemon</i> sp.	-	<sub>a</sub> 2	<sub>a</sub> 10	-	-	.08	-	-
F	<i>Phlox longifolia</i>	-	-	<sub>ab</sub> 8	<sub>a</sub> 1	<sub>b</sub> 18	.01	.00	.14
F	<i>Ranunculus testiculatus</i> (a)	-	-	<sub>b</sub> 167	<sub>a</sub> 48	<sub>b</sub> 120	1.67	.15	.36
F	<i>Senecio multilobatus</i>	<sub>a</sub> 6	-	-	<sub>a</sub> 1	-	-	.00	-
F	<i>Tragopogon dubius</i>	<sub>a</sub> 4	-	<sub>a</sub> 7	-	-	.07	-	-
F	<i>Trifolium</i> sp.	-	-	1	-	-	.00	-	-
F	<i>Zigadenus paniculatus</i>	-	-	2	-	-	.00	-	-
Total for Annual Forbs		0	9	210	121	454	1.81	0.37	4.74
Total for Perennial Forbs		120	51	142	12	156	0.92	0.04	4.35
Total for Forbs		120	60	352	133	610	2.74	0.41	9.10

Values with different subscript letters are significantly different at  $\alpha = 0.10$

BROWSE TRENDS --

Management unit 18A, Study no: 24

Type	Species	Strip Frequency			Average Cover %		
		'97	'02	'07	'97	'02	'07
B	Artemisia tridentata wyomingensis	73	63	67	9.63	8.08	7.72
B	Atriplex canescens	0	1	0	-	-	-
B	Chrysothamnus nauseosus	1	0	0	.00	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	1	1	2	-	.15	-
B	Gutierrezia sarothrae	63	70	28	1.08	2.32	.47
B	Juniperus osteosperma	5	5	6	-	1.62	1.57
B	Opuntia sp.	2	2	1	-	-	-
Total for Browse		145	142	104	10.71	12.18	9.77

CANOPY COVER, LINE INTERCEPT --

Management unit 18A, Study no: 24

Species	Percent Cover	
	'02	'07
Artemisia tridentata wyomingensis	9.03	8.64
Gutierrezia sarothrae	2.76	.56
Juniperus osteosperma	1.31	1.50

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 18A, Study no: 24

Species	Average leader growth (in)	
	'02	'07
Artemisia tridentata wyomingensis	1.5	1.6

POINT-QUARTER TREE DATA --

Management unit 18A, Study no: 24

Species	Trees per Acre		Average diameter (in)	
	'02	'07	'02	'07
Juniperus osteosperma	51	67	1.9	2.7

BASIC COVER --

Management unit 18A, Study no: 24

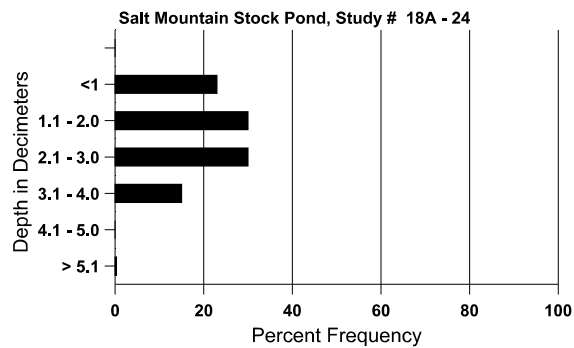
Cover Type	Average Cover %				
	'83	'89	'97	'02	'07
Vegetation	2.25	15.00	36.75	41.09	49.45
Rock	.25	.50	.83	1.85	1.75
Pavement	10.00	7.25	7.19	4.97	6.96
Litter	52.00	49.50	45.63	48.98	40.97
Cryptogams	2.00	.50	3.69	2.94	2.01
Bare Ground	33.50	27.25	16.01	16.11	16.11

SOIL ANALYSIS DATA --

Herd Unit 18A, Study no: 24, Salt Mountain Stock Pond

Effective rooting depth (in)	Temp °F (depth)	pH	Sandy clay loam			%OM	ppm P	ppm K	dS/m
			%sand	%silt	%clay				
12.73	69.5 (12.8)	7.6	52.0	20.4	27.6	2.1	4.8	224.0	.5

## Stoniness Index



PELLET GROUP DATA --

Management unit 18A, Study no: 24

Type	Quadrat Frequency		
	'97	'02	'07
Sheep	2	-	-
Rabbit	12	49	64
Elk	-	-	2
Deer	18	12	20
Cattle	2	4	3

Days use per acre (ha)	
'02	'07
-	-
-	-
-	5 (12)
27 (74)	4 (10)
8 (22)	10 (25)

BROWSE CHARACTERISTICS --  
Management unit 18A, Study no: 24

		Age class distribution (plants per acre)					Utilization					
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
<i>Artemisia tridentata wyomingensis</i>												
83	<b>4732</b>	-	66	2766	1900	-	42	44	40	.70	23	24/42
89	<b>3066</b>	1800	-	1733	1333	-	9	1	43	5	15	19/25
97	<b>3060</b>	520	560	1500	1000	360	29	8	33	19	20	20/36
02	<b>3060</b>	-	660	1460	940	580	14	0	31	16	16	19/28
07	<b>2720</b>	-	200	1560	960	460	25	15	35	18	20	22/32
<i>Atriplex canescens</i>												
83	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
89	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
97	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
02	<b>20</b>	-	-	20	-	-	0	0	-	-	0	-/-
07	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
<i>Chrysothamnus nauseosus</i>												
83	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
89	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
97	<b>20</b>	-	20	-	-	-	0	0	-	-	0	-/-
02	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
07	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
<i>Chrysothamnus viscidiflorus viscidiflorus</i>												
83	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
89	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
97	<b>20</b>	-	-	20	-	-	0	0	-	-	0	6/9
02	<b>20</b>	-	-	20	-	-	0	0	-	-	0	7/7
07	<b>60</b>	-	-	60	-	-	0	67	-	-	0	6/7
<i>Gutierrezia sarothrae</i>												
83	<b>0</b>	-	-	-	-	-	0	0	0	-	0	-/-
89	<b>200</b>	-	-	200	-	-	0	0	0	-	0	10/11
97	<b>4540</b>	320	1320	3140	80	-	.44	0	2	.88	.88	11/19
02	<b>4680</b>	-	20	4100	560	560	0	0	12	4	12	6/9
07	<b>1000</b>	140	100	620	280	-	8	2	28	10	20	7/10



		Age class distribution (plants per acre)					Utilization					
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
<b>Juniperus osteosperma</b>												
83	<b>300</b>	-	100	200	-	-	0	0	-	-	22	56/56
89	<b>100</b>	-	100	-	-	-	0	0	-	-	0	-/-
97	<b>100</b>	20	80	20	-	140	0	0	-	-	0	-/-
02	<b>100</b>	-	20	80	-	220	0	0	-	-	0	-/-
07	<b>120</b>	-	60	60	-	80	0	0	-	-	0	-/-
<b>Opuntia sp.</b>												
83	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
89	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
97	<b>40</b>	-	-	40	-	-	0	0	-	-	0	4/9
02	<b>40</b>	-	-	40	-	-	0	0	-	-	0	-/-
07	<b>20</b>	-	-	20	-	-	0	0	-	-	0	4/7
<b>Purshia tridentata</b>												
83	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
89	<b>0</b>	-	-	-	-	-	0	0	-	-	0	-/-
97	<b>0</b>	-	-	-	-	-	0	0	-	-	0	8/28
02	<b>0</b>	-	-	-	-	-	0	0	-	-	0	10/54
07	<b>0</b>	-	-	-	-	-	0	0	-	-	0	22/64